



Climate change and eutrophication induced shifts in northern summer plankton communities

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Abstract:

Marine ecosystems are undergoing substantial changes due to human-induced pressures. Analysis of long-term data series is a valuable tool for understanding naturally and anthropogenically induced changes in plankton communities. In the present study, seasonal monitoring data were collected in three sub-basins of the northern Baltic Sea between 1979 and 2011 and statistically analysed for trends and interactions between surface water hydrography, inorganic nutrient concentrations and phyto- and zooplankton community composition. The most conspicuous hydrographic change was a significant increase in late summer surface water temperatures over the study period. In addition, salinity decreased and dissolved inorganic nutrient concentrations increased in some basins. Based on redundancy analysis (RDA), warming was the key environmental factor explaining the observed changes in plankton communities: the general increase in total phytoplankton biomass, Cyanophyceae, Prymnesiophyceae and Chrysophyceae, and decrease in Cryptophyceae throughout the study area, as well as increase in rotifers and decrease in total zooplankton, cladoceran and copepod abundances in some basins. We conclude that the plankton communities in the Baltic Sea have shifted towards a food web structure with smaller sized organisms, leading to decreased energy available for grazing zooplankton and planktivorous fish. The shift is most probably due to complex interactions between warming, eutrophication and increased top-down pressure due to overexploitation of resources, and the resulting trophic cascades.

Source: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3680480>

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes

Geographic Feature:

resource focuses on specific type of geography

Ocean/Coastal

Geographic Location:

resource focuses on specific location

Climate Change and Human Health Literature Portal

Non-United States

Non-United States: Europe

European Region/Country: European Region

Other European Region: Baltic Sea

Health Impact: 

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation: 

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type: 

format or standard characteristic of resource

Research Article

Timescale: 

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: 

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content